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An Uncertain Risk: The World Health Organisation's Account of H1N1

CONTACT DETAILS:

Dr. Sudeepa Abeysinghe

Research Fellow, Policy and Politics Group

London School of Hygiene & Tropical Medicine

London, UK, WC1H 9SH

Ph: +44 0207 927 2122

e-mail: sudeepa.abeyasinghe@lshtm.ac.uk

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ARGUMENT

Scientific uncertainty is fundamental to the management of contemporary global risks. In 2009, the World Health Organisation (WHO) declared the start of the H1N1 Influenza Pandemic. This declaration signified the risk posed by the spread of the H1N1 virus, and in turn precipitated a range of actions by global public health actors. This article analyses the WHO's public representation of risk and examines the centrality of scientific uncertainty in the case of H1N1. It argues that the WHO's risk narrative reflected the context of scientific uncertainty in which it was working. The WHO argued that it was attempting to remain faithful to the scientific evidence, and the uncertain nature of the threat. However, as a result, the WHO's public risk narrative was neither consistent nor socially robust, leading to the eventual contestation of the WHO's position by other global public health actors, most notably the Council of Europe. This illustrates both the significance of scientific uncertainty in the investigation of risk, and the difficulty for risk managing institutions in effectively acting in the face of this uncertainty.

KEY WORDS: World Health Organisation; Uncertainty; Pandemic; Risk; Contestation; Sociology

Introduction

Uncertainty has lately been recognised as being an integral element of science and research. Whereas science had previously been concerned with advancing certainty and control over the natural world, contemporary science is defined by the concept of uncertainty (Funtowicz and Ravetz, 1993). This is reflected in what Latour (1998) refers to as a fundamental shift from 'science', where problems of investigation arose from within scientific communities, towards 'research', where problems of investigation are generated from wider society for scientific communities to resolve. The contemporary emphasis on 'research' over 'science', in part a reflection of the societal concern with risk, represents a fundamentally different manner of scientific knowledge-making, which has been termed 'post-normal' or 'Mode-2' science (as a contrast to Kuhn's (1970) 'normal science', though see Tumpenny et al. (2011) for the debate surrounding the use of this term). The problems of 'research', being real-world problems, encompass a wide range of uncontrollable variables, whereas the problems of 'science' often investigate highly specific and controlled phenomenon (Jasanoff, 2004b; Nowotny et al., 2001). This paper demonstrates what happens when scientific uncertainty informs and is made central to the assessment of pandemic risk. Though case studies of the effect of scientific uncertainty upon institutional decisions have previously been discussed, this has generally related to the topic of environmental and climate change issues (Marshall and Picou, 2008; Ravetz, 2004; Solaranta, 2001). The effect of uncertainty is often implicitly apparent within the social science of health literatures. However, this paper demonstrates how the concept of post-normal science can be used to draw out the role of scientific uncertainty within public health risk communication.

In the last few decades, scientific and public health commentators have emphasised that an influenza pandemic is likely to be imminent (Lazzari and Stohr, 2004; Webby and Webster, 2003; Webster, 1997). This increasing expectation of the next big pandemic has underpinned actions by public health officials aimed at political and institutional preparedness (Dehner, 2012; Giles-Vernick and Craddock, 2010). In June 2009, the global spread of the influenza (A)H1N1 virus was formally declared by the WHO to constitute a ‘pandemic’ – the first pandemic declaration in 40 years (Cohen and Enserink, 2009). This declaration sparked the enactment of national and local pandemic management plans worldwide. However, by the time that the Post-Pandemic Period had been formally announced in August 2010, the WHO’s action surrounding the 2009 H1N1 Pandemic had received major criticism. Some prominent political actors, particularly the Council of Europe, proposed that the WHO had ‘faked’ the pandemic, in order, they maintained, to maximise the profit of pharmaceutical companies (Flynn, 2010). These criticisms were underpinned by the fact that, by the WHO’s immediate count, the H1N1 pandemic had resulted in only approximately 18,500 laboratory-confirmed deaths worldwide. Further, the fact that the WHO had altered the definition of ‘pandemic’ within its Pandemic Alert Phases immediately prior to the advent of H1N1 was also highlighted by critics as a sign of mismanagement (IHR, 2011; Watson, 2010; see also Abeysinghe, 2013).

Understanding the WHO’s risk narrative is therefore pivotal to understanding the event of H1N1 as a whole. This paper centres upon the analysis of policy, media statements, and other documents released by the World Health Organisation over the course of the 2009 H1N1 Pandemic, starting from the initial detection of the viral spread up to the declaration of the ‘Post-Pandemic Period’.

Through this analysis, the paper outlines the WHO's public risk narrative surrounding H1N1. It argues that this risk narrative reflected the nature of contemporary science surrounding risks. The WHO focussed on relating scientific and epidemiological uncertainty to citizens, governments and other public health organisations. As a consequence of the impact of scientific uncertainty upon the WHO's management decisions, the presentation of risk underwent drastic shifts over the (official) course of the pandemic. The WHO successfully conveyed the ambiguity inherent in pandemic events, but failed to convey risk in a consistent or socially robust manner. This highlights an interesting dynamic in the institutional production of risk. Though public health actors are often criticised for inaccurately portraying risk (either in magnifying or minimising risk within public narratives) (Best, 2001; Hacking, 1999; Hindess, 1973), when an institution seeks to define risk in transparent but weakly defined terms, the very transparency evident in these shifting risk narratives can make the risk narrative easier to publicly contest. The WHO's construction of the risk of H1N1 therefore poses an interesting case study both because it reflects shifts in institutional (un)certainty, and because it provides insight into the effect of institutional attempts to incorporate uncertainty into its public communication of risk.

The Sociology of Pandemics, Risk and the WHO

The recently revived sociology of epidemic and pandemic disease has provided a source of useful literature for understanding the social construction, distribution and management of pandemic events. The communication of pandemic risk to publics through the media (Fogarty et al., 2011; Tauscik et al., 2012; Warren et al., 2010; Nerlich and Koteyko, 2011) has been explicated as a key site in which the perception of threat is constructed. Likewise, lay and public health narratives of

risk (Davies, 2011; Wagner-Egger et al. 2011) help to produce the response to pandemic threats. This literature provides a useful understanding of how risk becomes constructed once the presence of a pandemic threat is acknowledged. What is equally important though are the mechanisms through which a disease first comes to be observed and constituted as an object of interest and concern. In the case of pandemics, this process occurs primarily within the institution of the WHO, which processes global epidemiological information in order to understand the risk posed by a (potential) pandemic agent.

Global surveillance and institutional structures, as specified by the International Health Regulations 2005 (IHRs), are principle in the construction of the risk of pandemic (Barker and Fidler, 2006; Calain, 2007; Mack, 2007; Wilson et al., 2010). Academic literatures surrounding the application and implications of the IHRs are well-developed. These include analyses from the viewpoint of securitisation and biorisks (Atlas and Reppy, 2005; Caduff, 2012; Cooper, 2006), and the role and effect of surveillance in relation to the contemporary emphasis on pandemics from biopolitical and other perspectives (Bashford, 2006; Keil and Ali, 2007; Martinez, 2000). The IHRs, and the WHO's role within them, are also pivotal to the understanding of the WHO's risk narrative. The 2005 IHRs set out procedures for detecting and acting upon global health threats. It requires states to report disease outbreaks of international concern to the WHO. It also maintains that states should strengthen their surveillance and mobilisation capacity. When a country first detects a novel or concerning disease event, it is required to promptly report this to the WHO Secretariat, and through this, the World Health Assembly. The surveillance data collected by affected countries is shared with the WHO, which (with the technical assistance of countries and other actors, such as pharmaceutical companies in the case of vaccine development) co-operate to analyse this data and

formulate response. Though the IHRs outline set codes for action, and are considered legally binding, the 2005 IHRs lack enforceable sanctions, as was clear within WHO statements during the pandemic (Fukuda, 06/05/09; 07/05/09) and in the post-pandemic analysis of its application (WHO 2011). Further, while states are required under the IHRs to strengthen surveillance capacity, many places affected by 2009 H1N1 lacked strong surveillance and epidemiological capabilities. This, coupled with the novelty and speed of the event, was pivotal in producing scientific uncertainty; while states were required to report to the WHO, the Organisation needed to make management decisions based upon limited and variable evidence. Further, the technical capabilities of the WHO, in examining the globally reported evidence had at the time been largely geared towards short term and geographically bounded events (WHO 2011: 11), which further added to the lack of clarity surrounding H1N1.

The WHO plays a key institutional role within the current IHRs in collecting and disseminating epidemiological data surrounding viral agents. Moreover, the WHO is a critical site in the constitution of an event as a 'pandemic' – it is the institution responsible for formally declaring the presence of a pandemic threat and for distributing knowledge surrounding that threat to other global health actors. The WHO is thereby both a central producer of scientific knowledge surrounding pandemics (as it collects, collates, and disseminates international data) and a key risk managing institution (as it releases statements, documentation, and advice surrounding the risk posed by pandemic threats). The way in which the WHO portrayed the risk of H1N1 was therefore fundamental to the management of the virus by other health institutions.

In order to investigate the WHO's risk narrative, this paper draws upon concepts of risk and uncertainty from the co-productionist perspective within the sociology of science. The co-productionist perspective demarcates its field of interest as concerning the production of scientific knowledge within the wider societal context, often with a particular emphasis upon the role of uncertainty within contemporary the contemporary scientific enterprise (Jasanoff, 2004a; 2004b). In sociologically conceptualising risk, a co-productionist perspective adopts constructivist theories of risk (from Beck, 1992; Bauman, 1999; Giddens, 1991; 1999), agreeing that contemporary society is fundamentally risk-laden. The impact of this risk upon the practice of scientific knowledge-making is taken as a site for investigation (Shackley and Wynne, 1996; Solantra, 2001).

In this case, the WHO acted as the institution responsible for mediating scientific evidence (i.e. the epidemiological data produced by global surveillance programs) in creating a narrative of risk. This risk narrative was disseminated to publics, governments, and other public health actors through the documents and statements produced by the WHO (which this paper analyses). What this case study shows is the way in which the WHO's (incomplete) scientific understanding of the virus served to produce the public narrative of risk, which in turn reflected upon the way in which the WHO's epidemiology was examined and criticised by outside actors. Contemporary aspects of research production, which are inherently uncertain in that they speak to unfolding risk events, critically impacted the WHO's ability to negotiate and produce its public risk discourse and was fundamental to the eventual contestation of this discourse.

Uncertain Science and the WHO's Risk Discourse

To explain the WHO's risk discourse surrounding H1N1, it is important to outline the context of uncertainty under which decisions were made. As suggested by a co-productionist perspective, research produced under conditions of risk is always in itself uncertain, due to the number of variables and contingencies involved in the (potential/perceived) manifestation of a risk (Shrader-Frechette, 1993; Nowotny, 2003; Miller, 2004). By definition, (potentially) pandemic agents such as H1N1 are novel, complex, variable and ill-understood. It is assumed that science provides stable and objective answers (Best, 2001; Hindess, 1973), and in this case that public health bodies can accurately identify pandemic threats. However, at best what is achieved are probabilistic models, which are essentially untestable and tentative (Funtowicz and Ravetz, 1993). The scientific knowledge produced surrounding pandemic risk therefore tends to be anecdotal (based upon necessarily limited evidence and relatively few initial cases) and theoretically speculative (based on hypothetical models of future spread and pathogenicity). In the case of the World Health Organisation and H1N1, the Organisation was well-aware of the presence of uncertainty, and attempted to co-opt an understanding of scientific uncertainty within its narrative of risk (see also McPhail, 2010, on the concept of strategic uncertainty). The conditions of post-normal science where therefore pivotal to the WHO's public representation of risk.

The WHO perceived and related uncertainty in regards to H1N1 in a number of ways. One of the primary locations of uncertainty in regards to pandemic events lies in the nature of pandemic-causing viral agents. Influenza viruses are particularly susceptible to genetic reassortment and mutation, in ways which can fundamentally change the pathogenicity, virulence, or transmissibility of the virus. An important facet of the WHO's narrative surrounding H1N1 revolved around accounting for the 'evolving' virus, and the possible public health implications of this. Overall, it

was suggested that “[t]he virus writes the rules and this one, like all influenza viruses, can change the rules, without rhyme and reason, at any time” (Chan, WHO Director-General, 11/06/09). Looming in the background was the threat of a triple reassortment virus containing genes from pre-existing strains of swine, avian and human flu. The potential of such threats underpinned the WHO’s actions towards H1N1. Indeed, the Organisation’s revision of the Pandemic Alert Phases, just prior to the case of H1N1, had attempted to grapple with such notions of pandemic risk. While critics of the WHO argued that this shift in definition reflected the WHO’s attempt to mischaracterise the pandemic threat, such a conscious mischaracterisation would have been detrimental to the Organisation’s long-term interests. Instead, the definition of pandemic revealed an assumption that pandemics would necessarily be severe, and therefore focused upon other measurable characteristics (e.g. geographical spread) in determining risk (see also Abeysinghe, 2013).

The idea that the H1N1 virus was likely to undergo genetic shifts and drifts over time was therefore fundamental to the WHO’s risk narrative surrounding it. Within its public announcements, the institution emphasised the inconsistency of H1N1. This conceptualisation of the virus as a constantly changing and adaptable organism underpinned the WHO’s narrative of risk and severity. The WHO was unable to represent a clear narrative of the effect of the viral spread because of the mutability of H1N1:

...history has told us that these viruses are very, very, very unpredictable. And this virus is spreading in human populations, these viruses mutate. These viruses change, these

viruses can further reassort with other genetic material. (Ryan, WHO Director of Global Alert and Response, 02/05/09)

A consistent narrative of the threat of the pandemic was untenable because the WHO perceived the H1N1 virus to be fundamentally variable.

In this context the WHO portrayed itself unable (or unwilling) to make a definitive announcement on the likely impact of the viral spread, as the situation was 'evolving' in a way that would mirror the evolution of the unstable viral agent. Thus, the WHO's own narrative of the event aimed at reflecting the uncertainty of the virus:

So our overall assessment is that the situation continues to evolve as we have been stressing from the beginning, and in keeping again in the messages from many speakers, we are not quite certain how this is going to evolve. (Ben Embarek, WHO Food Safety Scientist , 04/05/09)

However, the institution needed to coherently convey a sense of risk surrounding the event in order to facilitate public health actions. As such, it became important for the WHO to reconcile the idea of an evolving and uncertain threat with the justification of its concern about it. This especially included the veil of epidemiological uncertainty which surrounded the disease, including data surrounding the true spread and severity (including ratio of morbidity to infection) of the H1N1 virus. From the initial detection of the threat, an interest in the epidemiology of H1N1 was clear as "[w]e really need to understand a bit more about epidemiology, we want to understand a bit more

about the behaviour of these viruses” (Fukuda, Special Advisor to the WHO Director-General on Pandemic Influenza; Assistant-Director General, 26/04/09). Thus, understanding the epidemiology was considered paramount to understanding the risk caused by the spread of H1N1.

Science, Risk and Statistics

While scientific information was considered fundamentally necessary to the WHO’s successful management of the event, simultaneously, the uncertain nature of the science was emphasised. One of the primary functions of the WHO in managing this concern was the collection and global dissemination of information surrounding the threat. The organisation suggested that the information surrounding H1N1 was vast:

One of the interesting things about this whole situation is that the amount of information available on what is unfolding is really probably unprecedented. There is more information available about the epidemiology, about the viruses, than has ever been true certainly for a global outbreak like this. (Fukuda, 14/05/09)

However, despite the fact that much information had been gathered surrounding the pandemic, one of the major concerns of the WHO was to collect further information to provide understanding of the ‘evolving’ threat.

Information was considered to be a primary tool in combating the uncertainty posed by the spread of the H1N1 virus. As the quote below suggests, the WHO considered the collection and collaboration of information as a fundamental way in which to combat pandemic threats:

...when you are facing a new disease threat probably the single most important thing, more than drugs or anything, is just information. If communities and families have information, if countries have information, that is the most powerful thing that you need in the beginning. Without that, you are really in the dark, you do not know what to do, you cannot understand what is going on. (Fukuda, 07/05/09)

In this way, the Organisation emphasised the importance of developing the science surrounding H1N1. This was:

...[an] area which we are focussing pretty heavily on, is what is the science. ...[W]e can describe what is going on, but we really want to understand why, because it is the “why” which is going to give us a handle on how do we handle this better, how do we treat it in a really scientific way, but science does not come overnight. (Ben Embarek, 04/05/09)

In respect to influenza, along with the basic virology, the science of epidemiology constitutes the primary basis of scientific investigation. Thus, clarifying uncertainty surrounding the epidemiological nature of the disease would help to clarify the underlying understanding of risk. However, at the same time, the management of H1N1 was characterised by the WHO as underpinned by the idea of scientific uncertainty:

Whenever we see a new disease...we are in a period of great uncertainty. This is true of the current period right now. One of the difficulties for decision-makers and countries and public health institutions is that they need to make decisions, they need to move ahead even though many things are not so clear or are not known. (Fukuda, 09/06/09)

The decisions made in regards to the event were understood and produced through this frame of uncertainty.

As the case developed, the epidemiological data itself was increasingly understood as being replete with uncertainties; this perspective is consistent with the production of post-normal science surrounding risks. The epidemiology of the disease could not be definitively known due to aspects of the testing and reporting mechanisms surrounding it, especially the fact that different WHO regions and member states conducted surveillance and reporting with varying degrees of accuracy. For example:

In terms of flu deaths, in purely epidemiological estimates of the number of any deceased, you certainly know that there is a big uncertainty. The surveillance is not that precise.... (Fukuda, 06/05/09)

In this way, it was difficult for the Organisation to clearly respond to epidemiological evidence. Uncertainty surrounded the scientific evidence itself, and emphasised the general uncertainty inherent in the pandemic event.

The WHO constructed its risk narrative through the frame of this scientific uncertainty. One of the problems here, as with any global risk, is that the element of uncertainty means that there are almost limitless possibilities as to how the case can unfold. In respect to a pandemic, the spread of H1N1 might have possibly eventuated in a large-scale pandemic of the nature of the 1918/19 Spanish Influenza, or it might have resolved suddenly. As such, in regards to the future manifestation of the risk, the limits were infinite:

Is it theoretically possible that this epidemic could certainly stop for unknown reasons, although this is probably unlikely at this point. It is also possible that we could continue on with the spread of relatively mild illness in most countries.... And it is also possible, that as we go into the future, we will see more serious cases. These options are all possible. (Fukuda, 29/04/09)

The WHO needed to deal with this range of possibilities in their management of the threat. This included adopting an understanding of uncertainty within its risk narrative. This fact was most overwhelmingly evident in respect to the WHO narrative surrounding statistics.

Accounts of health risks in general tend to make good use of mortality, morbidity and other statistics in characterising a health threat as significant. While many social scientific works have decried the use, and misuse, of statistics in this way (Best, 2001; Hacking, 1999; Hindess, 1973), this represents a primary mechanism through which risks are constituted. In order for the spread of the H1N1 virus to be perceived as threatening, the WHO needed to be able to represent the threat in terms of concrete numbers and outcomes. However, the WHO did not subscribe to the common

use of statistics in conveying the risk of H1N1. This represents an important departure in the usual ways of narrating risk, and is a direct result of the structures and discourses of post-normal science. The recognition of scientific uncertainty (Fuctowicz, 1994; Nowotny et al., 2001) manifested in this case as institutional uncertainty. The 'science' surrounding the risk of H1N1 was incomplete – but more importantly, the WHO acknowledged this incompleteness, rather than representing a strong and consistent risk communication narrative. Thus, the perception of scientific uncertainty informed and underpinned the public communication of risk.

In contrast to the usual narrative of risk through facts and stable discourse, the Organisation in fact represented statistics themselves as innately ambiguous and open to interpretation. While media questions in particular concentrated on rate of morbidity and mortality, the WHO representatives downplayed the importance of such statistics. The epidemiological statistics were understood and represented by the WHO as irrelevant to the risk posed by H1N1. Thus, these statistics were 'de-emphasised' as the media and publics were warned not to be concerned about them.

...as we go into this situation, the numbers themselves will become a little bit more irrelevant. We now have countries that are moving away from counting cases individually because there are too many cases. So just to give you [a] heads up, we will begin to de-emphasize the numbers because they will increasingly not reflect what is going on. (Fukuda, 22/05/09)

In this way, according to the WHO's narrative, risk could not be (and was not) characterised by the WHO in terms of epidemiological statistics.

This suggestion that the 'science' would always be inadequate, a recognition of contemporary structures of research around risk, served to contradict the concern with information and understanding the epidemiology. The WHO's risk narrative in this regard mirrored the inherent uncertainty of science within conditions of risk. Contemporary risks are multifactorial, and thereby indefinable objects of scientific investigation. Overall it was emphasised that "[a]s you know, we have been really stressing the fact that we shouldn't focus too much on the figures because they are pretty fluid and they can change fairly often" (Ben Embarek, 04/05/09). The epidemiological statistics were seen as unmanageable, and innately variable. As such, they were understood as not truly representative of the threat of H1N1. Overall, the statistics were regarded as ambiguous and peripheral to the task of assessing risk. Attempts were made to outline the fragility of the statistical information. For example, in explaining the WHO's emphasis on laboratory-confirmed cases, the representative needed to explain that it was difficult to keep account of the true rate of infection and suspected infection:

This is a figure that we do not track very carefully. The suspected cases – all national authorities investigate disease cases – and then there are ones that they have confirmed cases.... But is it not something that we ask the counties to report to us.... Then we are not dealing with ambiguities, I simply don't have those figures, I can't tell you how many investigated cases there are now. (Ben Embarek, 04/05/09)

The fact that the WHO was not able to refer to statistics as a resource for the representation of risk was critical in terms of the overall narrative.

Instead of relying upon assertions of scientific fact or illustrations of epidemiological evidence, the WHO concentrated upon relaying the underlying understanding of uncertainty in accounting for the risk of H1N1. Definitive statements on the nature of the virus and its spread were lacking. As suggested in one statement:

This picture is changing, and so this is why we have stressed about [sic] the evolving nature of the situation, this is why we have really refrained from jumping quickly to say: “this is mild”, “this is something”, because we know that we are seeing things change on an almost daily basis. (Fukuda, 11/05/09)

The idea of change and uncertainty was therefore central to the WHO’s narrative of risk. While epidemiological and other evidence needed to be collected to (at least partially) assuage the inherent uncertainty of the situation, in the end such evidence was itself ambiguous.

Risk managing institutions need to deal with the scientific uncertainty inherent within contemporary risks. The WHO’s narration of risk in respect to the H1N1 pandemic accommodated scientific uncertainty by resting upon an appeal to (rather than an erasure of) uncertainty as the basis of risk. The WHO declared that the spread of the H1N1 virus constituted a pandemic in part due to the presence of scientific uncertainty. Since a severe global pandemic would be a devastating event, the WHO needed to act in a way that may have best minimised such a scenario. Due to this potential for devastation, and in reflection of the future-oriented nature of global risks (Beck, 1992, 1999), the WHO needed to act. Following the event, the Precautionary Principle, a risk

management approach that focuses upon anticipatory preventative action (Dean, 2010; Dreyer and Renn, 2009; Levidow, 2001; Marshall and Picou, 2009, Renn et al., 2011; Stebbing, 2009) was invoked in reference to the WHO's actions surrounding the event. It is interesting and notable that within the documents analysed (those produced within the pandemic period) the WHO did not emphasise the Precautionary Principle, and the topic appeared only infrequently. In fact, in making its critique of the WHO, the Council of Europe more consistently emphasised (and problematised) the Precautionary Principle in respect to the WHO's actions, despite the fact that it is widely considered to be a valid risk management technique (perhaps particularly where the risk is scientifically uncertain) (Gollier & Treich, 2003; Liess & Hruddy, 2003). Certainly, the WHO's post-pandemic analysis invoked the Principle (IHR 2011). Regardless, it is clear that the prospect of global catastrophe underpinned the WHO's actions; despite the uncertainty of the science, the WHO needed to act upon H1N1 due to its potential.

The situation was represented as uncertain due to the evolving and mutable nature of the H1N1 virus itself. This resulted in an overall impression of uncertainty and inconsistency surrounding the event. This was also reflected in the context of scientific evidence, where epidemiological statistics, often a barometer of threat and risk, were discarded as ambiguous in nature. In the end, this allusion to uncertainty also resulted in an inconsistent and ambiguous risk narrative, and one that was not socially robust, and therefore open to criticism by other public health actors.

THE CONTESTATION OF THE WHO'S ACCOUNT OF RISK

The WHO's account of the risk posed by H1N1 reflected the continuously shifting epidemiological information which the Organisation was receiving. However, this meant that the account changed significantly over time, and failed to definitively or consistently narrate the risk produced by the H1N1 virus. The WHO's risk narrative, a manifestation of post-normal science, reflected scientific uncertainty in a way which was apparently true to the available data, but meant that the narrative was not consistent or socially robust. As articulated by Nowotny (2003) and Nowotny, Scott and Gibons (2001), the idea of 'socially robust' knowledge suggests that in contemporary society, scientific 'facts' need to be acceptable in multiple public and institutional domains (i.e. be 'socially' as well as 'scientifically' robust) in order to be effectively mobilized constructions. The concept has been best applied in the sociology of the environment, for instance in analyses of climate change debates (Miller, 2004; Solantra, 2001). The concept has not been without criticism, especially on the grounds of lack of conceptual clarity (Weingart 2011). Further, at points, Nowotny and colleagues suggest that the production of socially robust knowledge is a 'better' and more inclusive (i.e. democratized) type of knowledge (see Nowotny, 2003a; 2003b; Nowotny, et al. 2001). However, in the case of this present discussion, the term is described in a descriptive, rather than normative sense.

Knowledge or scientific discourse is 'socially robust' to the extent that it is able to stand up to interrogation (and integrate with different lay and public knowledges) within the public sphere. The WHO's portrayal of risk did not match up to either public perceptions of pandemics as severe events or the lay understanding of scientific certainty. This meant that, particularly in light of the relative mildness of H1N1, the WHO's portrayal of risk was subject to contestation. The communication of global health threats is central to the WHO's function. In respect to pandemic events, the WHO plays a vital organising and representing role. As such, it was critical that the WHO was able to communicate the threat posed by H1N1 in a way that was discernible and credible to multiple

global health actors – governments, corporate actors, health professionals, the media, and the public. As such, a socially robust risk narrative was crucial in the case, as it was vital that the WHO was regarded as credible and was able to effect global public health actions.

The Council of Europe was the first and one of the most prominent political bodies to contest the WHO's account of H1N1. The Council of Europe claimed that the WHO's characterisation of the effects of the spread of H1N1 was grossly overestimated, and the product of corporate pressure, and had led to a 'false scare' and unnecessary mobilisation of public health resources. This narrative was offered through a series of investigations, parliamentary debates, and a final resolution on the matter which condemned the WHO's handling of the situation, all of which then filtered into media and public discussion. What is important in the context of this discussion is not the impact which the Council of Europe resolution had upon the management of H1N1, since this debate and resolution were passed after the severity of the H1N1 Pandemic had effectively been determined, and was primarily a retrospective criticism. Rather, what is interesting here is the way in which the Council of Europe's discourse represented and criticised the WHO's discourse surrounding risk. The criticism was important in framing media and public perceptions of the WHO's management, long after the threat of severe pandemic had passed. In contrasting the Council of Europe's depiction of H1N1 with the WHO's risk narrative, the fragility of the WHO's account of risk is highlighted, and the effects of the WHO's attempt to co-opt a sense of scientific uncertainty into the risk narrative is at the forefront of the criticisms.

Epidemiological statistics, and the way in which the accounts of the WHO employed them, were a central theme in the contestation of the labelling H1N1 a 'pandemic'. Wolfgang Wodarg

(epidemiologist, a chief critic of the WHO's actions, and then member of the Council) and Ulrich Keil (epidemiologist and testifying expert) produced submissions to the Council of Europe's investigation into H1N1 that pointed to epidemiological aspects and suggested that in fact the virus should never have been recognised by the WHO as pandemic-causing. The morbidity and mortality statistics of the disease were cited as evidence of this proposition. For example, Wodarg suggested that:

Given the fact that the influenza is always a very contagious disease which spreads very rapidly and leads to a greater number of cases, it is surprising to see the extent to which attention was focused on that flu [H1N1] after the reporting of only hundreds of cases.

(Wodarg, 26/01/10)

Employing allusions to epidemiological statistics as far more certain points of data, the Council of Europe argued that the low mortality rate of H1N1 demonstrated that the event could not be labelled a pandemic. Thus, "[a]ccording to the epidemiology, this swine flu was likely to be mild" (Flynn, 29/03/10). The Council of Europe criticised the WHO's depiction of the risk posed by H1N1, instead suggesting that the virus did not warrant the WHO's concern. For example the infectious disease specialist Michele Rivasi suggested:

I think that there are several types of responses we can have. First we have 'what is the justification of the pandemic?'. First of all, I looked at data, and in particular I looked at all the WHO alerts and reports before the pandemic was declared on the 11th of June 2009. And I think that what we find ourselves confronted with here is manipulation...

(Rivasi, 29/03/10)

Rivasi made the explicit suggestion that the WHO had engaged in manipulation by declaring the pandemic when they did. In another example, it was asserted that:

On the eve of the declaration of the pandemic, the WHO declared that the majority of cases were benign. So the cases were benign, the virus was benign, and nevertheless on the 11th of June the pandemic was declared, alert level 6. What I wondered about when looking at these facts, is the unfolding of this all. Even when we look at the WHO notifications we have the feeling that the WHO deliberately staged the events. (Rivasi, 29/03/10)

According to the Council of Europe narrative, the H1N1 virus did not represent a pandemic threat; the pandemic declaration and accompanying risk narrative was unjustified and perhaps (according to some testimonies) even fabricated. The WHO's characterisation of H1N1 as a pandemic, and particularly the suggestion that scientific evidence was contrary and inadequate, was therefore fundamentally contested in this account.

The WHO's risk narrative in respect to H1N1 represented a critical institutional failure— the WHO did not present either itself or its actions in a robust and convincing manner, leaving the 'facts' of the pandemic liable to contestation. By emphasising scientific uncertainty, the WHO had had constructed the threat as almost 'factless'. For the Council of Europe, the WHO's actions appeared not to have been supported by scientific/'objective' evidence – not because such evidence did not exist, but because the WHO had denied the scientific truth of the situation. The suggestedly 'unscientific' actions of the WHO were presented as a key site of criticism. For example, it was stated that:

Exactly a year ago, a very bad decision was taken by the World Health Organization that now seems unscientific and irrational. The result of that decision was that the whole world became scared that a major plague was on the way – a new pandemic that would have been as bad, according to reports, as the flu pandemic of 1918. There seems to have been no scientific basis for that decision. (Flynn in Council of Europe Parliamentary Assembly, 24/06/10)

Again, this suggests that the Organisation defied scientific evidence in its decision-making process. However, from a co-productionist perspective, the climate of scientific uncertainty under which the WHO made initial decisions rendered them susceptible to such critique after the events. The WHO acted in a climate of scientific uncertainty, which was clear in within the organisation's risk narrative. However, after the event, the scientific 'facts' appeared more definitive to outside actors.

As demonstrated above, the WHO emphasised the uncertainty surrounding H1N1 and the threatening nature of the pandemic, thereby justifying the responses made. The Council of Europe suggested that the WHO presented an inflated account of risk, which resulted in a disproportionate response to the threat. In portraying the WHO's risk narrative, the Council of Europe suggested that the Organisation was duplicitous or at least inept in its communication of risk to national governments and the general public. Thus their concern was posed:

When looking at the still very moderate expression of the pandemic almost one year after its outbreak, the way in which scientific and empirical evidence has been

interpreted can be seriously questioned. The main question is whether WHO overstated the threat posed by the virus, ignoring the practical evidence that the pandemic seemed to be of “moderate severity” from its very start. (Flynn, 23/03/10:3)

In this regard, it was suggested that that threat of H1N1 had been unduly exaggerated by the WHO. The uncertainty of the event was erased in the Council of Europe’s account, and the WHO’s position was liable to retrospective contestation.

The effect of scientific uncertainty on a risk managing institution such as the WHO can be widespread. The Council of Europe asserted that the WHO’s mischaracterisation of risk resulted in diminished trust in the management of public health. The Council’s claims highlighted the centrality of trust in the institutional management of risk (Alaszewski, 2003; Giddens, 1991; Luhmann, 2002). They argued that the WHO manufactured a situation which resulted in widespread panic, including, as Keil stated “...hysterical announcements and reactions of ministries, scientific bodies and not least the media...” (Keil, 26/01/10). This panic and the associated lack of an actual threat (in terms of the Council’s narrative of incidence and severity) resulted in a diminished public confidence in the WHO and other public health institutions. In this way, as Wodarg claimed, “WHO ‘gambled away’ public confidence” (Wodarg, 26/01/10) through their handling of the incident.

The Council of Europe’s documents constantly reiterated the suggestion that the WHO’s actions had undermined goodwill in public health institutions. This was considered by the Council of Europe to be one of the pivotal long-term effects of the WHO’s decisions in regards to H1N1. The suggestion of ‘crying wolf’, and its detrimental effect on trust in the WHO, was prominent:

...the next time somebody cries wolf, the overwhelming majority of people will not be listening. And who do we have to thank for that? We have to thank either the inept bureaucratic dumbness of the World Health Organization or the spiteful evil manipulation of the World Health Organization by the drug companies around the world.

... If there is a pandemic in the future and people don't listen, then they [the WHO] have only themselves to blame. (Hancock in Council of Europe PACE Meeting, 29/03/10)

Employing a variety of techniques, including historical analogy, the Council strongly argued that the WHO's actions eroded public trust. Having declared the pandemic in a time of scientific uncertainty, the WHO opened itself to the critique of 'crying wolf' when a severe threat did not eventuate.

The Council of Europe and the WHO presented fundamentally divergent narratives of the risk posed by H1N1 at different points in time. Citing many of the same sources of evidence and examples as the WHO, the Council argued that the WHO's mischaracterisation of risk led to an erosion of trust in the institution. In regards to controlling contemporary risks, the management of public perception is crucial, due to the heavily integrated nature of the modern scientific enterprise (see Nowotny et al., 2001). The Council of Europe's emphasis upon trust foreshadows the potential effect of the WHO's management of H1N1 upon its role in global public health. However, the Council of Europe suggested that this was not a result of the embedded risk and uncertainty of the situation, but rather a result of WHO mismanagement. This therefore highlights the institutional difficulty with managing risk in the context of scientific uncertainty.

Conclusion

Global health risks, such as the threat of an influenza pandemic, necessarily carry within them a vast range of future potentialities. It is clear that uncertainty has important consequences upon the way in which a threat is perceived and reacted to by a risk-managing institution. Once a pandemic state had been declared, the World Health Organisation needed to convey a coherent risk narrative in order to motivate other global actors into action. In representing H1N1, the WHO co-opted an understanding of scientific uncertainty within its risk narrative. The inherent uncertainty faced by the WHO was working was clear, and evidently underpinned its narrative of H1N1. This meant that the usual deference to scientific 'facts', particularly epidemiological statistics, was not evident in this case. Instead, the WHO chose to minimise the utility of statistics and 'hard' science in its risk narrative, focussing upon uncertainty as a fundamental marker of risk.

These risk narratives can be seen as a consequence of the structures of science and investigation within which the WHO was acting. In the absence of complete or unambiguous scientific evidence surrounding H1N1, the WHO still needed to make decisions regarding the management of the virus. The eventual manifestations of (relatively mild) disease caused the institution to re-evaluate and reinterpret its narrative over time. In this way, the WHO's changing and unstable narrative was a consequence of the nature of the science within which it was working. Given that contemporary global risks are generally underpinned by a veil of scientific ambiguity or (by their novel nature) lack research, the narratives of the WHO, which represent a shift away from citing statistical 'facts', and towards citing inherent uncertainty, provides a case study through which to investigate and

understand the institutional ramifications of uncertain risks. Many contemporary global risks are subject to scientific uncertainty, and in the case of novel problematisations, lack sufficient research findings. This case study of the WHO's management of the H1N1 virus provides one example of an institution that shifted from citing statistical 'facts' towards emphasising the inherent uncertainty contained in such facts. This thereby illustrated the fundamental impact of scientific uncertainty upon a risk management institution, and the centrality of uncertainty within novel public health events. Further, in the case of the WHO, the risk communication produced lacked both consistency and social robustness – the narrative shifted over time and failed to effectively characterise risk given the eventual mildness of the event. This was pivotal to the subsequent criticisms of the WHO's actions.

While many health and global risks are uncertain, the way in which the WHO managed its risk narratives in this case provides a counter-intuitive example. Rather than attempting to erase uncertainty, as predominantly occurs in the production of public risk narratives, the WHO embraced the concept of uncertainty, and made this a central feature of its risk discourse. This actually served to provide a weakness, which was used exploited by the Council of Europe in mobilising a contrasting account of the risk of H1N1. After the events unfolded, the evidence surrounding H1N1 appeared more concrete, and (since a severe disease had not appeared) seemed to indicate inaccuracy in the WHO's construction of risk. This highlights the problems faced by a risk managing institution that must simultaneously produce a consistent and robust account of risk while also negotiating scientific uncertainty. The case study of the WHO's risk narrative surrounding H1N1 therefore serves to demonstrate the effect that scientific uncertainty can have upon a risk managing institution, and how this can lead to the contestation of the scientific 'facts' surrounding a

risk. The WHO integrated scientific uncertainty into its risk communication, but was not able to do so in a socially robust or consistent manner. This was inevitably crucial to the contestation of the WHO's narrative and actions surrounding H1N1. This emphasises the difficulties involved with both acknowledging and incorporating scientific uncertainty into global risk management and communication.

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